

Smoking Cessation Counseling With Pregnant and Postpartum Women: A Survey of Community Health Center Providers

ABSTRACT

Objectives. This study assessed providers' performance of smoking cessation counseling steps with low-income pregnant and postpartum women receiving care at community health centers.

Methods. WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) program staff, obstetric clinicians, and pediatric clinicians at 6 community health centers were asked to complete surveys. Smoking intervention practices (performance), knowledge and attitudes, and organizational facilitators were measured. Factors associated with performance were explored with analysis of variance and regression analysis.

Results. Performance scores differed significantly by clinic and provider type. Providers in obstetric clinics had the highest scores and those in pediatric clinics had the lowest scores. Nurse practitioners and nutritionists had higher scores than other providers. Clinic type, greater smoking-related knowledge, older age, and perception of smoking cessation as a priority were independently related to better counseling performance.

Conclusions. Mean performance scores demonstrated room for improvement in all groups. Low scores for performance of steps beyond assessment and advice indicate a need for emphasis on the assistance and follow-up steps of national guidelines. Providers' own commitment to helping mothers stop smoking was important. (*Am J Public Health.* 2000;90:78–84)

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Smoking during pregnancy and postpartum is harmful to the fetus and the baby as well as the woman. It increases the possibility of low birthweight and preterm birth and the child's risk of sudden infant death syndrome, asthma, upper respiratory infections, and hospitalization for pneumonia or bronchitis.^{1–4} The impact of these sequelae has prompted the inclusion in national health objectives of smoking cessation and relapse prevention in pregnant and postpartum women.⁵

Approximately 25% of US women who become pregnant are smokers at the time they learn they are pregnant.⁶ Studies have shown that 23% to 40% of these women spontaneously quit after learning they are pregnant.^{7,8} The majority, however, continue to smoke throughout pregnancy. The highest smoking rates are found among women with the lowest income and those with less than a high school education.^{6,8}

While researchers have demonstrated some success in prenatal smoking cessation,^{9–11} relapse remains a problem. More than one quarter of women who quit spontaneously relapse by 6 weeks postpartum, and more than two thirds have relapsed by 6 months postpartum.^{12,13} The highest relapse rates occur among women who have low income and little education and are single and White.¹⁴ A pediatrics-based intervention was effective in helping women remain abstinent during the postpartum period,^{15,16} but other research targeting relapse prevention has had mixed results.^{17–19}

Provider-delivered interventions are effective in promoting smoking cessation,^{20,21} especially when there is an office system to cue providers.^{22,23} Randomized studies have demonstrated that training plus reminders for physicians and other medical staff significantly increases cessation rates among pregnant women.^{15,24} A meta-analysis of 39 smoking cessation randomized trials in general medical practice settings²⁰ suggests that inter-

vention success increases with the number of intervention modalities employed, the number of health professionals involved, and the number of follow-up assessments conducted. An integrated effort beginning during pregnancy and continuing throughout the critical 6-month postpartum period could potentially decrease relapse rates.

This study was undertaken as part of a trial to test a multicomponent intervention. The 3-pronged approach includes provider counseling, an office practice system, and linkages among prenatal and pediatric care providers and the WIC program (Special Supplemental Nutrition Program for Women, Infants, and Children) in community health centers (CHCs). CHCs provide comprehensive care to vulnerable populations in medically underserved areas of the United States,^{25,26} offering supplemental services including social welfare services, nutrition programs, transportation, outreach, and health education.²⁶ Thus, they provide an ideal environment for a team of providers to deliver consistent messages.

In this article we examine the relationships between performance of smoking cessation counseling steps and variables hypothesized to predict performance among providers caring for low-income pregnant and postpartum women. The data are from a

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survey of prenatal, pediatric, and WIC care providers in CHCs participating in the randomized trial.

Methods

Subjects and Data Collection

Data were collected during the winter and spring of 1996–1997 at 6 CHCs in greater Boston, Mass. These sites were selected from an initial pool of 14 CHCs with on-site WIC programs. Selection criteria included patient demographics, particularly race and ethnicity, and on-site provision of prenatal and pediatric services.

Within each CHC, staff from the WIC program, the prenatal clinic, and the pediatric clinic completed self-administered surveys. A designated staff member from each of these 3 groups worked with the project director to distribute surveys, with personalized cover letters and blank envelopes for use in returning the surveys, to 257 part-time and full-time clinicians and nutrition staff (registered dietitians and paraprofessionals). Each staff member was asked to complete the survey, seal it in an envelope, place it in a box that had a list of staff names taped to it, and cross his or her name off the list. This method permitted anonymity while allowing efficient follow-up reminder efforts. Two follow-up reminder notices were sent to each staff member who did not return a survey.

Instrument Design and Study Measures

In selecting survey items, we considered existing empirical evidence, theoretical models, and formative research (key informant interviews with medical, clinic, and program directors at all sites). Different versions of a core survey were created to be appropriate for each of the 3 provider groups; these surveys were pretested within a CHC not participating in the trial. The state-level WIC staff also provided feedback on appropriate wording for the nutrition staff survey. The final instruments contained approximately 15 items, some multipart, plus 10 demographic items.

Survey items related to provider counseling were based on the National Cancer Institute's 4 A's of smoking cessation counseling (Ask, Advise, Assist, Arrange),²⁷ considered a standard of practice.²¹ Building on previous work,^{28–31} the dependent measure in these analyses was a composite measure of providers' self-reported smoking intervention practices or performance. Because providers' roles and tasks vary, a set of indi-

vidual steps corresponding to the 4 A's was created for each clinic or program type. Providers indicated with what proportion of their patients/clients (none, some, most, or all) they used each intervention step. Each step was scored as follows: 0 points for none, 1 point for some, 2 points for most, and 3 points for all. The separate scales for WIC, prenatal, and pediatric providers included 14 items, 15 items, and 16 items, respectively, each with a possible score of 0 (low) to 3 (high). Performance scores were obtained by averaging scores of the individual items on each scale.

Variables hypothesized to affect performance were based on social cognitive theory³² and organizational theory.^{33,34} Together, these theories address beliefs about factors both internal to the provider and external, that is, in the work environment. External factors comprise concepts related to the situation and a person's perceptions of the environment, including professional norms, behavioral supports, and patient/client preferences. Given the potential response burden, we limited constructs and items to those we believed to have the greatest potential for predictive power and specificity for use in planning and evaluating smoking interventions with low-income pregnant and postpartum women. In some cases, the number of items per construct differed by clinic or program type, either because of differences in behaviors expected of different types of providers (e.g., a prescription for pharmacotherapy would be expected of a pediatrician but not a nutritionist) or because of differences in the time frame of the provider's relationship with the patient/client (prenatal only, postpartum only, or both).

Knowledge. Ten to 12 factual items (depending on clinic or program type) about smoking and pregnancy and/or the postpartum period were to be answered "yes," "no," or "don't know" or, alternatively, as multiple choice. Among the topics covered were the effects of smoking on fetal and infant health and the use of nicotine replacement therapy.

Role perception. Two or 3 items (depending on clinic) assessed the extent to which providers believed it was their role to intervene with low-income pregnant and/or postpartum women who smoked. Responses were on a 5-point scale from "not at all" to "great extent."

Effectiveness of counseling. Two or 3 items (depending on clinic or program type) assessed providers' perceptions of the effectiveness of smoking cessation counseling for the target population. Responses were on a 5-point scale from "not at all effective" to "very effective."

Self-efficacy. An important element of social cognitive theory is self-efficacy, defined as an individual's belief about his or her ability to execute specific actions. Providers answered 5 or 6 specific self-efficacy items (depending on clinic or program type) related to smoking intervention on a 5-point scale ranging from "not at all confident" to "very confident."

Difficulty (barriers). Perceived barriers can be important factors in the set of beliefs that triggers a person's actions,³⁵ and previous studies have investigated barriers to smoking cessation counseling.^{36–39} Providers rated the level of smoking intervention difficulty (high, medium, or low) posed by 9 patient characteristics, such as language, emotional problems, and presence of other substance abuse problems.

Priorities. Three items, each scored on a 5-point scale ("strongly agree" to "strongly disagree"), assessed providers' perceptions about the importance they and their patients/clients placed on smoking cessation counseling.

Provider motivation. Our earlier work suggested that providers' interest in and dedication to patient/client counseling reflected their level of personal commitment and motivation with regard to the smoking issue.³⁹ Eight items assessed these characteristics on a 4-point scale ("strongly agree" to "strongly disagree").

Organizational facilitators. Organizational theory and related studies^{33,40,41} emphasize the influence of work environment and culture on workers' behaviors. Social cognitive theory also posits that behavior can be explained by reciprocal interaction between behavioral, personal, and environmental influences.³² Fourteen items assessed providers' perceptions about the work environment and culture related to smoking intervention on a 5-point scale ("strongly agree" to "strongly disagree"). A principal factor analysis was performed in which principal components were used as the method of initial extraction. Two eigenvalues had values greater than unity and explained 86% of the variability in the items. Varimax rotation resulted in 1 factor that was loaded heavily on items related to clinic or program leadership and support. The second factor was loaded heavily on items related to clinic/program systems. Two scales, corresponding to the 2 factors *leadership* and *systems*, were computed.

Scores on all scales except knowledge were computed as the mean of the scores for items constituting the scale. A clinic- or program-specific knowledge summary score was computed as the number of items answered correctly. (Item wording is available from the corresponding author.)

Analyses

Linear modeling techniques were used to explore factors associated with self-reported performance. The bivariate association of each factor with performance was computed first. For categorical factors, mean performance in each factor category was computed by analysis of variance (ANOVA). For continuously scaled factors, a regression of performance on the factor was computed and the slope coefficient was reported. All factors bivariately associated with performance were entered into an analysis of covariance to explore the independent associations with performance. Interaction effects of factors included were tested for statistical significance and were retained if they were significant at the .05 level. Analyses were carried out with SAS statistical software.⁴²

Results

Surveys were distributed to 257 providers. The sample sizes for the clinics and programs were WIC, 54 (80% response rate); prenatal, 57 (50% response rate); and pediatric, 66 (76% response rate), resulting in an initial sample of 177 respondents (69% overall response rate). A very low response rate in the prenatal clinic of 1 site with a large number of providers lowered the overall prenatal clinic response rate considerably. Performance scores could not be calculated for 6 providers (2 WIC, 3 prenatal, and 1 pediatric) because of missing values, so analyses were conducted on the remaining 171 respondents. The mean age of the respondents was 40 years (range, 24–64; median = 40); the average length of employment at the CHC was 5.5 years (range, 0–40; median = 3); and the mean number of hours per week spent in patient/client care was 27 (range, 0.5–80; median = 30).

The mean performance score differed significantly by clinic or program type (Table 1). Prenatal clinic providers had the highest average performance scores, and pediatric clinic providers had the lowest. Differences in performance were found among provider types (Table 2), with nurse-practitioners and nutrition staff scoring the highest. Non-Hispanic Blacks and Whites had significantly higher performance scores than did Hispanic providers. There was no difference in performance by sex, by whether the provider was multilingual, or by CHC. Older provider age was significantly associated with higher performance, whereas years of employment at the clinic and number of hours per week spent in patient/client care were not.

TABLE 1—Providers' Performance Scores on Steps of Smoking Cessation Counseling, by Clinic or Program Type (n = 171): Boston, Mass, Community Health Centers, 1996–1997

Steps	Mean Score (SD)		
	WIC Program (n = 52)	Prenatal Clinic (n = 54)	Pediatric Clinic (n = 65)
a. Assess smoking history and status	1.88 (1.18)	2.76 (0.58)	1.83 (0.89)
b. Give clear, strong advice	1.43 (1.08)	2.69 (0.67)	1.98 (0.80)
c. Assess interest in quitting	1.71 (1.14)	2.44 (0.79)	1.66 (0.87)
d. Assess reasons for quitting	1.27 (1.08)	2.00 (0.98)	1.36 (0.86)
e. Urge uninterested to think about quitting	1.38 (1.12)	2.41 (0.77)	1.65 (0.87)
f. Help develop a cessation plan, including a quit date	1.35 (1.18)	2.24 (0.97)	1.48 (1.00)
g. Assist with strategies to prevent relapse	0.94 (1.07)	1.65 (0.95)	0.78 (0.87)
h. Arrange for between-visit support	0.47 (0.83)	0.37 (0.71)	0.20 (0.51)
i. Refer to resources as appropriate	1.16 (1.07)	1.22 (1.08)	1.03 (0.93)
j. Address weight gain	1.08 (0.97)	...	...
k. Discuss smoking at follow-up visit	1.35 (1.05)	1.81 (0.99)	1.31 (0.89)
l. Use open-ended questions/problem-solve	1.32 (1.10)	1.76 (0.99)	1.13 (0.80)
m. Provide educational materials	1.59 (1.13)	1.87 (1.06)	0.68 (0.81)
n. Assist with strategies for decreasing environmental tobacco smoke	...	...	1.52 (0.81)
o. Assist ex-smokers with relapse	...	1.23 (1.10)	... prevention
p. Discuss NRT with pregnant women	...	0.81 (0.99)	...
q. Discuss NRT with breast-feeding women	...	...	0.37 (0.7)
r. Discuss NRT with non-breast-feeding women	...	...	0.36 (0.6)
s. Record encounter in medical record	0.83 (1.07)	2.06 (0.98)	0.94 (0.96)
Average score	1.31 (0.82)	1.82 (0.55)	1.14 (0.53)

Note. Scores reflect the proportion of patients with whom providers followed each step: 0 = no patients; 1 = some patients; 2 = most patients; 3 = all patients. The possible range for a mean score is 0–3. Ellipsis points indicate that the item was not included as a step in the performance scale for that clinic or program type. NRT = nicotine replacement therapy.

Table 3 shows the relationship of providers' knowledge and perceptions to performance. Reported knowledge was fairly low. Providers perceived it as their role to intervene when their patients or clients smoked; viewed interventions as moderately effective; viewed themselves as moderately confident in providing intervention; rated intervention difficulty as medium to high; rated their personal motivation as high; rated clinic leadership as moderate to high (leadership was scored so that a high score indicates low leadership); and viewed system support as low. Self-reported performance was significantly associated with all scales except clinic/program systems support and difficulty (barriers).

With respect to perceived priorities, most providers (75%) agreed with the statement "The women [mothers] we see in our practice [WIC program] have so many other problems in their lives that stopping smoking is a very low priority for them" (item A), while most (83%) disagreed with the statement "The women [mothers] we see in our

practice [WIC program] have so many problems in their lives that intervening about smoking is a very low priority for me" (item B). Providers who disagreed with either or both items had significantly higher performance scores than other providers ($P = .005$ for item A and $P = .0001$, respectively). Providers were more evenly divided on the third statement, "Most women [mothers] want us to provide them with smoking cessation counseling" (item C); 43% agreed with this perception. Providers who agreed with item C had significantly higher performance scores than others ($P = .02$).

All variables bivariately associated with performance were included in the analysis of covariance (Table 4). Differences in performance by clinic/program type remained statistically significant when other variables were controlled for. Providers at WIC and prenatal clinics had higher overall performance scores than pediatric providers, although the difference in performance between WIC and prenatal clinics was

TABLE 2—Characteristics of Providers and Relationship of Categorical Factors to Performance Scores for Smoking Cessation Counseling: Boston, Mass, Community Health Centers, 1996–1997

Categorical Factors	No. (%)	Mean Performance Score (SD)		<i>P</i> ^a
Clinic or program type				.0001
WIC	52 (30.4)		1.31 (0.82)	
Prenatal clinic	54 (31.6)		1.82 (0.55)	
Pediatric clinic	65 (38.0)		1.14 (0.53)	
Sex				.67
Male	22 (13.3)		1.40 (0.45)	
Female	143 (86.7)		1.34 (0.72)	
Race/ethnicity				.007
Hispanic	18 (11.2)		0.90 (0.78)	
White, non-Hispanic	114 (71.2)		1.50 (0.67)	
Black, non-Hispanic	16 (10.0)		1.46 (0.62)	
Other	12 (7.5)		1.32 (0.51)	
Language				.68
English only	89 (53.0)		1.43 (0.72)	
Multilingual	79 (47.0)		1.38 (0.67)	
Provider type				.0001
Physician	52 (32.9)		1.41 (0.53)	
Nurse-practitioner or midwife	38 (24.0)		1.69 (0.61)	
Registered nurse	22 (13.9)		1.10 (0.63)	
Nutritionist	24 (15.2)		1.66 (0.60)	
Nutrition assistant	22 (13.9)		0.93 (0.80)	
Health center site				.50
A	34 (19.9)		1.32 (0.52)	
B	22 (12.9)		1.49 (0.68)	
C	39 (22.8)		1.40 (0.72)	
D	24 (14.0)		1.40 (0.78)	
E	19 (11.1)		1.66 (0.77)	
F	33 (19.3)		1.31 (0.74)	
Continuous Factors	Mean (SD)	<i>b</i>	<i>P</i> ^b	<i>r</i>
Age, y	39.95 (10.14)	.0215	.0001	0.3175
Years at clinic	5.50 (6.32)	−.0044	.60	0.0416
Hours/week in patient care	27.05 (14.71)	−.0008	.83	0.0172

Note. Performance scores are the average of the 14 to 16 individual scores on the steps of the performance scale, which was customized for each clinic or program type (see Table 1).

^a*P* for test of equality of means (ANOVA).

^b*P* for test that correlation is zero.

reduced when the other variables were controlled for. Greater knowledge and older age remained significantly associated with higher performance. Providers' perception of the priority of counseling also remained statistically significant. Differences by providers' race/ethnic group, role perception, perception of the effectiveness of intervention, self-efficacy, motivation, and perception of organizational leadership were also no longer statistically significant when other variables were controlled for.

We tested for an interaction of clinic/program type and the other independent variables on performance. The association between self-efficacy and performance differed significantly by clinic/program type. Performance increased with self-efficacy in all clinics/programs, but the relationship was stronger for prenatal and pediatric clinics than for WIC programs. In WIC programs, providers who

agreed that mothers want counseling had higher performance scores than those who disagreed. In pediatric and prenatal clinics, the difference in performance between those who agreed that mothers want counseling and those who disagreed was small.

Discussion

The mean performance scores (Table 1) illustrate room for improvement by all clinic/program and provider types in overall performance as well as specific counseling steps. The prenatal clinic providers had the highest overall performance scores, followed closely by WIC program staff. Pediatric providers had the lowest scores. The low response rate for prenatal clinics may explain this finding. It may be that providers with better performance were more likely to respond. The

greater variability in the WIC staffs' responses may reflect the fact that WIC nutrition staff include both professional nutritionists and paraprofessional nutrition staff trained on the job. Perhaps the training of nurse-practitioners and physicians is more homogeneous, resulting in responses with less variability.

Although some providers reported performing all steps of smoking cessation counseling with *some* patients, our results indicate that intervention steps are not generally applied with *all* smokers. The Agency for Health Care Policy and Research clinical practice guideline recommends that primary care clinicians identify patients' smoking status, counsel smokers at every visit, and offer nicotine replacement therapy to patients planning to quit.²¹ The performance scores reported here suggest that more must be done to meet the *Healthy People 2000* objective that 75% of primary care providers offer assistance to patients who smoke.⁵

Differences in scores between pediatric, prenatal, and WIC providers may reflect differing perceptions of who the patient is: the woman in prenatal clinics; the woman during pregnancy but the infant postpartum in WIC programs; and the child in pediatric clinics. Zapka et al. found that pediatricians intervened less frequently with parents who smoked than they did with either children/adolescents who smoked (cessation) or children/adolescents who did not smoke (prevention).⁴³ Although pediatric smoking interventions with mothers have been shown to be effective,^{15,16} widespread adoption of this practice in CHCs has apparently not occurred.

Physicians perceive themselves as better prepared to counsel smokers if they have attended training sessions.^{44,45} Performance increased with self-efficacy scores in all clinic/program types when interaction of clinic type was controlled in the multivariate model, but the relationship was strongest in the pediatric and prenatal clinics. Pediatric clinicians may not have received training in smoking cessation counseling for adults and thus may feel less prepared to offer counseling. Zapka et al. found that pediatricians who had participated in smoking cessation intervention training counseled parents more often than those who reported no training.⁴³

In this survey, nurse-practitioners and midwives had the highest performance scores of all provider types. These results contrast with those of Secker-Walker et al., who found physicians significantly more likely than a combined group of other professionals (family planning counselors, WIC nutritionists, and public health nurses) to report counseling female patients about smoking.⁴⁶ The different types and groupings of health professionals make a comparison of findings difficult, how-

TABLE 3—Regression of Performance Scores for Smoking Cessation Counseling With Selected Provider Characteristics, Perceptions, and Knowledge Measures: Boston, Mass, Community Health Centers, 1996–1997

	Scales			
	Mean (SD)	<i>b</i>	<i>P</i> ^a	<i>r</i>
Knowledge (summary scale) ^b	3.50 (1.90)	9.0	.001	0.24
Perceptions (continuous scale)				
Role ^c	4.14 (0.95)	0.22	.0001	0.30
Effectiveness of counseling ^c	3.12 (0.99)	0.19	.0002	0.27
Self-efficacy ^c	2.73 (0.97)	0.27	.0001	0.38
Difficulty (barriers) ^d	1.76 (0.49)	−0.0076	.95	−0.0054
Motivation ^c	3.24 (0.45)	0.30	.01	0.19
Leadership (organizational facilitators) ^e	2.12 (0.46)	−0.2683	.02	−0.1774
System (organizational facilitators) ^c	1.87 (0.51)	−0.08	.46	−0.0576

Perceptions	Single Items		
	No. (%)	Mean Performance Score (SD)	<i>P</i> ^f
a. Mothers we see in our practice have so many other problems in their lives that stopping smoking is a very low priority for them.			.005
Agree	125 (75)	1.34 (0.66)	
Disagree	42 (25)	1.68 (0.73)	
b. Mothers have so many problems in their lives that intervening about smoking is a very low priority for me.			.0001
Agree	28 (17)	0.94 (0.50)	
Disagree	136 (83)	1.52 (0.69)	
c. Most mothers want us to provide them with smoking cessation counseling.			.02
Agree	71 (43)	1.56 (0.69)	
Disagree	95 (57)	1.31 (0.69)	

^a*P* for test that correlation is zero.^bRange 0–10.^cFive-point response scale.^dThree-point response scale.^eFour-point response scale.^f*P* for test of equality of means.

ever. The present survey assessed self-reported behaviors of the various types of health professionals (e.g., physician, nurse/nurse-practitioner, WIC nutritionist) separately.

There are other possible reasons for differences in performance between provider types. Preparation programs for nurses and midwives may place more emphasis on patient education and counseling than do programs for physicians. Nurse practitioners may have more contact and continuity with their patients, which may facilitate counseling. In some prenatal clinics, prenatal and postpartum education is conducted by nurse-practitioners more often than by nurse midwives or physicians. Many midwives and physicians work in clinics on a contract basis for as little as 4 hours per week, while most nurse-practitioners work full-time. WIC nutritionists' scores between those of nurse-practitioners/midwives and physicians may be attributable to the mandatory question on

smoking in the Massachusetts WIC computerized intake system. The system prompts providers to ask each client if she smokes. There is no equivalent prompt for prenatal or pediatric providers.

Providers' performance was better on some counseling steps than on others. Performance means varied from highs for assessment and advice to lows for arranging support and discussion of nicotine replacement therapy. Other researchers have also noted that providers pay less attention to developing cessation strategies and to follow-up visit support, despite research demonstrating that follow-up increases cessation rates.^{20,46,47} Training curricula for clinician-delivered interventions must emphasize strategies corresponding to the assist and follow-up steps of national guidelines on smoking cessation counseling.²⁷

Prenatal and pediatric providers' reported performance concerning nicotine replace-

ment therapy was very low. The Agency for Health Care Policy and Research guideline is not clear on the use of nicotine replacement therapy with pregnant and lactating women, stating that the clinician should use nicotine replacement therapy "only if the increased likelihood of smoking cessation, with its potential benefits, outweighs the use of nicotine replacement and potential concomitant smoking."^{21(p69)} No guidelines are suggested for weighing the risks and benefits or modifying nicotine replacement therapy for use with these populations. Clinicians are perhaps understandably reluctant to recommend nicotine replacement therapy to their pregnant and lactating patients.

The multivariate analysis provides interesting observations about the independent factors that affect providers' practices. Of the demographic characteristics we assessed, only age (increasing) was significantly related to improved practice. This association of increased age with higher performance is in contrast to some previous findings^{38,48} and in agreement with others.⁴⁵ Perhaps older providers' experience increases their concern and their willingness to talk with patients/clients about difficult behavioral issues. Employment measures, including number of hours spent with patients/clients per week and number of years at the health center, had no impact on performance. Only the provider's perception of the priority of intervention was independently significant among priorities, reinforcing the key importance of providers' own commitment to providing interventions.³⁹

The knowledge score remained significantly associated with performance when the other factors were controlled for (Table 4). Knowledge is a prerequisite to performance, but it is typically not independently predictive of behavior. The investigators worked to make the knowledge questions challenging, given the ceiling effect found in other studies.^{45,49} Possible explanations for the present findings are that providers who possess detailed knowledge have received more training in tobacco control issues, including counseling steps, or that they are more committed and therefore pay more attention to smoking-related information. Increased knowledge of the specifics of damage to the fetus and infant from maternal smoking may be an extra impetus for providers to counsel women.

Given the recent attention to systems interventions for smoking cessation, including guidelines for strategies and office systems^{15,21,27} and research in this area,^{24,50–53} the lack of relationship of perceived system factors with performance in this survey is puzzling. Potential explanations include providers' low awareness of the barriers presented and

TABLE 4—Mean Performance Score or Slope for Analysis of Covariance of Performance: Smoking Cessation Counseling: Boston, Mass, Community Health Centers, 1996–1997

	Mean Score	Slope	P ^a
Clinic or program type			.001
WIC	1.40	...	
Prenatal clinic	1.52	...	
Pediatric clinic	0.97	...	
Race/ethnicity			.17
Hispanic	1.22	...	
White, non-Hispanic	1.46	...	
Black, non-Hispanic	1.34	...	
Other	1.16	...	
Age (10-y increments)	...	0.16	.004
Role	...	0.05	.38
Effectiveness of counseling	...	0.06	.30
Self-efficacy	...	0.06	.35
Knowledge	...	0.75	.005
Motivation	...	−0.21	.35
Leadership	...	−0.12	.35
Women's priority low			.21
Agree	1.22	...	
Disagree	1.37	...	
Provider's priority low			.02
Agree	1.14	...	
Disagree	1.45	...	
Women want counseling			.76
Agree	1.28	...	
Disagree	1.31	...	

^aP for test that characteristic is associated with performance, with other characteristics held constant.

possible measurement error (i.e., the survey items may have lacked reliability or validity). Low awareness of system factors presents an additional challenge for interventions designed to change the environment; such interventions may have to start by raising providers' consciousness of system issues.

Several limitations of the study must be acknowledged. First, the survey was limited to providers working in a CHC setting; such individuals may differ from their peers in private practice on the issue of smoking, which affects a larger percentage of their patients. Second, all data were self-reported. Pbert et al.,⁵⁴ however, demonstrated good concordance among patient exit interview data, physicians' report of steps used, and a "gold standard" of scores from audiotaped encounters between patients and physicians. However, providers' self-reports about proportions of patients served may be less valid than those about services provided to individual patients.⁵⁵ Finally, although our response rates were similar to or higher than those of other published studies of providers, self-reported smoking cessation counseling practices may be higher among responders than among nonresponders.

In summary, this survey demonstrates the need for greater attention to provider training in smoking cessation intervention. CHC providers could be doing more to

improve their patients'/clients' cessation rates within the context of routine prenatal and postnatal care. It appears that providers in the CHC environment miss opportunities for intervention by not addressing smoking with their pregnant and postpartum patients/clients consistently at every visit. A national survey of primary care physicians⁵⁶ reflects the data presented here, suggesting that physicians' practices fall short of national objectives. While providers do fairly well on assessing smoking status and giving advice to stop smoking, more emphasis must be placed on providing assistance and follow-up. Given the low scores of pediatric clinicians and the unique opportunity they have to address postpartum relapse, interventions to increase their perception of smoking counseling as an important part of their role and to improve their counseling practice should be a high priority. Additionally, organizations must require that guidelines be implemented and must be willing to implement systems to assist providers in routinely intervening with the majority of their pregnant and postpartum patients/clients who smoke. □

Contributors

J. G. Zapka, L. Pbert, J. K. Ockene, A. M. Stoddard, and D. Bonollo planned the study and designed the

instruments. D. Bonollo supervised data collection. A. M. Stoddard and J. G. Zapka analyzed the data. J. G. Zapka, A. M. Stoddard, and K. V. Goins drafted the paper. L. Pbert, J. K. Ockene, and D. Bonollo contributed to the writing of the paper by reviewing drafts.

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This study was approved by the University of Massachusetts Medical School Institutional Review Board. Implied consent was obtained when a respondent returned the survey after reading the explanatory cover letter.

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